above-noticed, but on a larger scale and more detailed in its sketch of biological evolution. Dr. Simpson is orthodox in his science, but on the religious side conceives a World Principle immanent and transcendent, yet personal. "Of course, we cannot form a clear conception of such infinite, unconditioned personality. We are certain that it is something richer in content than our personality." The problem of sin is very well handled: the Genesis narrative is symbolically true, but does not teach that man fell from a state of goodness. On the contrary, he has risen from a state of *innocency,* such as the child's state before he learns to recognise good and evil. He must continue to rise, until he reaches communion with God through likeness to Him. The book contains much that is theologically and philosophically debatable, but is an excellent example of the modern literature of reconciliation, and does credit both to the learning and the piety of its author.

(8) Dr. Jones dedicates his book to Prof. Freud, among whose disciples he enrolls himself. Many interesting illustrations are given, showing the influence of subconscious desires in producing lapses of memory and the like. Other chapters deal with the relation between organic and functional diseases, simulation in hysteria, the pathology of morbid anxiety, the action of suggestion in psychotherapy, Freud's theory of dreams, and psycho-analysis and education. The writer is associate-professor of psychiatry in the University of Toronto. His book is extremely readable and good, chiefly by reason of its wealth of concrete examples. We may incline to think that the Freudian psychology is itself obsessed with sex-ideas, and is guilty of tracing everything to subconscious sexual thoughts or desires; but, after all, a theory is best tested by its thorough application to facts, and there is no doubt that Freud is a pioneer, comparable—it may be, as Dr. Jones suggests—with Darwin himself.

(9) These essays are, in the main, an expansion of a course of lectures delivered in the Queen's University of Belfast. They deal with subconsciousness, genius, pragmatism, pessimism, Nietzsche, &c. The opinions are well and temperately stated, and we only discover one dubious statement of fact—viz., that 98 per cent of all classes of persons are hypnotisable. This percentage is much higher than the average opinion of experts would allow. The author follows Myers in his psychology, according well-merited praise to that writer and to the careful work of the Society for Psychical Research.

J. A. H.

MATHEMATICAL TEXT-BOOKS.

(1) *Exercises in Modern Arithmetic.* By H. Sydney Jones. Pp. x+336. (London: Macmillan and Co., Ltd., 1912.) Price 2*s.* 6*d.*

(2) *Notes on Algebra.* By A. F. van der Heyden. Pp. viii+133. (Middlesbrough: Wm. Appleyard and Sons, Ltd, 1912.) Price 2*s.* 6*d.*

(3) *The Teaching of Mathematics in Secondary Schools.* By Arthur Schultze. Pp. xxi+370. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1912.) Price 5*s.* 6*d.* net.

(4) *Higher Algebra for Colleges and Secondary Schools.* By Dr. Charles Davison. Pp. viii+320. (Cambridge: University Press, 1912.) Price 6*s.*

(5) *Non-Euclidean Geometry: A Critical and Historical Study of its Development.* By Prof. Roberto Bonola. Authorised English translation with additional appendices. By Prof. H. S. Carslaw. With an Introduction by Prof. Federigo Enriques. Pp. xii+268. (Chicago: The Open Court Publishing Company, 1912.) Price 2 dollars net.

(6) *An Introduction to the Infinitesimal Calculus.* Notes for the use of Science and Engineering Students. By Prof. H. S. Carslaw. Pp. xii+137. (London: Longmans, Green and Co., 1912.) Price 5*s.* net.

(1) THIS volume consists of the examples reprinted from the author's work entitled "Modern Arithmetic with Graphic and Practical Exercises." The range covered is that required for the Oxford and Cambridge Local examinations. The quality of the examples, which are mainly of a practical character, is good. A number of typical examination papers are given at the end of the book.

(2) This note-book is intended for students who are revising the subject, not for those breaking new ground. There is much interesting historical information; but we are inclined to think that the treatment is scarcely sufficiently thorough for many purposes. For example, none but the simplest tests of convergence are given, the theory of numbers is represented by Fermat's theorem alone, and the method given for resolving partial fractions is inadequate. The geometrical representation of complex numbers, Demoivre's theorem and its applications are included.

(3) The object of the author in publishing this volume is to show that the purpose of a mathematical training is best served by making the course less informational and more disciplinary than is at present customary. He contends, and

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with some truth, that the majority of teachers aim at impressing a set of facts upon their pupils rather than training them how to attack and discuss mathematical problems. Unfortunately, there are few teachers who are free agents; the requirements of the various examining boards must first be satisfied before personal individuality can be freely exercised, and much of the best work of the first-rate teacher is of a character that examinations can scarcely test. At the same time, mathematical teachers should undoubtedly know something of the science of teaching, and cannot fail to profit by a knowledge of the experience of others. In the present volume, there is much of real interest and value. After preliminary general discussions, the author examines in great detail the theory of geometrical teaching and somewhat briefly the elements of a suitable course in algebra and trigonometry. Such a work as this should find a place in the common-room libraries of our secondary schools.

(4) This is a continuation of the author's former treatise on algebra for secondary schools. It opens with the binomial theorem and includes all that usually finds a place in an advanced school course. Among the chief features of the book may be noted an excellent chapter on complex quantity; the geometry of vectors is developed, and the use of trigonometric functions renders the account reasonably complete. By introducing the notation of the calculus, the treatment of limits is simplified and the usual applications in the theory of equations become possible. The work on continued fractions is put rather more briefly than usual, but nothing of importance for any ordinary purpose has been omitted. The volume has an attractive appearance, the examples are really good, and the essay questions at the end will be of great assistance to scholarship candidates.

(5) The study of non-Euclidean geometry has, till recently, attracted the attention only of the specialist; no doubt this has been due principally to the general belief that the difficulties were so considerable, the philosophical problems so intricate, and the subject so contrary to ordinary experience that the ordinary mathematician would, without prolonged study, make little of it. Time, however, invariably lowers the levels and extends the boundaries of the territory accessible to ordinary students. There are now a number of elementary text-books which make its pursuit a comparatively easy task. There are two valuable studies by Mr. Frankland—"The Theories of Parallelism" and "Euclid I., with a Commentary"—there is a primer by Prof. Manning, a more elaborate treatise by Prof. Coolidge, and, for those who read German, the works of Killing, Liebmann, Hilbert, Vahlen, etc.

The translation of Prof. Bonola's valuable critical and historical summary will be of the greatest assistance to students. The book opens with an account of the attempts to prove Euclid's parallel postulate which were made from the time of the Greek geometers down to the seventeenth century. The next section deals with the period when men were first beginning to inquire whether a form of geometry could exist independently of this postulate. This work is associated with the names of Saccheri, Lambert, Wolfang Bolyai and others; but it was not until the time of Gauss, Taurinus, Lobatschewsky, and Johann Bolyai that the foundations of non-Euclidean geometry were securely laid. A most interesting sketch is given of the growth of thought in this period. The concluding chapter discusses the later work of Riemann, Helmholtz, Lie, Cayley, Klein, etc. There are five appendices; these deal with (*a*) the fundamental principles of statics; (*b*) Clifford's parallels; (*c*) constructions; (*d*) the independence of projective geometry; (*e*) a method of exhibiting the impossibility of proving Euclid's postulate by a consideration of the analogous geometry of a system of circles orthogonal to a fixed circle. This last appendix, which is due to Prof. Carslaw and is based on Wellstein's work, establishes, by an elementary and elegant method, a number of interesting theorems in hyperbolic geometry.

(6) These notes on the calculus, drawn up for science and engineering students, are intended to supplement the earlier parts of the ordinary textbooks. The first chapter gives the analytical geometry of the straight line, the second illustrates the meaning of differentiation by examples from physics and geometry; in the next three the rules for differentiations are given; and the last two, after a few pages on the geometry of the conic, give an account of integration and its applications.

OUR BOOKSHELF.

Kausale und konditionale Weltanschauung. By Max Verworn. Pp. 46. (Jena: Gustav Fischer, 1912.) Price 1 mark.

EVEN when one profoundly disagrees, it is always a pleasure to listen to Prof. Max Verworn, for he has clear-cut convictions which he states vividly and with enthusiasm. The present essay is an exposition of "conditionism" as contrasted with "causalism," and it deals hard blows at vitalism, dualism, entelechy, free will, and other naive and uncritical assumptions, as Verworn thinks.

It may be of interest to state the five propositions of conditionism:—(1) There are no isolated

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